"On the Habits of *Platypus cylindrus*," and on that vexed question "The Life History of *Rhipiphorus paradoxus*," by Dr. Chapman, "On Rare Birds," by Mr. James W. Lloyd, and "On Herefordshire Lepidoptera," by several contributors. In botany, we have papers "On the Reproduction and Growth of the Mistletoe," by the Rev. R. Blight, "On some Curious Algæ only apparent in times of Drought," by E. Lees, a number of contributions on edible fungi and other mycological subjects, by Dr. Bull and other ardent Herefordshire fungophagists, and a continuation of the notes on "Remarkable Trees of Herefordshire." Geology contributes papers "On the Coralline Formations of the Oolite Rocks, by Dr. Wright; "On the Remains of a Giant Isopod, *Præarcturus gigas*," and "On *Eurypterus Brodiei*," by H. Woodward and others. Meteorology is represented by useful papers by Mr. H. Southall and Mr. E. J. Isbell. The illustrations are unusually abundant, including several of the fossils described, and photographs of remarkable trees, including one of a new mistletoe oak, which Dr. Bull has had the good fortune to find.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.*]

Science Teaching in Schools—An Offer to the London School Board

MR. JONES'S letter on the above subject in NATURE, July 27, has much surprised me, his results being so utterly at variance with those obtained during my own experience, which dates from 1848, and has extended over a considerable area, including Edinburgh, Birmingham, and London.

I have no doubt whatever that Mr. Morris's system may be carried out successfully, provided suitable teachers are selected. There may at first be some difficulty in doing this, the worst rock ahead, that upon which I suspect Mr. Jones's experiment has split, being pedantry. Ignorance is curable, but the pedant only progresses from bad to worse, and the atmosphere of schools and colleges is especially favourable to the propagation of the virulent moral pestilence under which he is suffering.

As a set-off against the discouraging results of Mr. Jones's experiments, I may state that between 1848 and 1854 an experiment of teaching physical, economical, and moral science to children of the poorer classes of all ages between five and sixteen, was carried out in Edinburgh, under the direct supervision of the late Mr. George Combe and Mr. James Simpson. Experimental physics, chemistry, general physiology, and economic science, were taught by myself, while the subjects of the advanced special physiology of the brain and moral philosophy were taught by Mr. Combe. Mr. Combe's class included only the senior pupils of ten years and upwards; my own classes embraced the whole school, and the fundamental principle of the instruction was that of *teaching the same subjects to all the children from the youngest upwards*, by adapting the mode of instruction to their respective ages and capacities.

Of all the numerous subjects thus taught to these children, the one which I found the most difficult and unsatisfactory was that of English orthography, while the easiest were those branches of physical science which I was able to teach with the aid of direct objective illustrations. For example, we had a very good articulated human skeleton, which was an object of great interest to all the children—a sort of pet toy, in fact. I found it much easier to teach to young children between four and five years of age the names of all the bones in that skeleton, than to teach them the names of the letters of the alphabet. The alphabet was a work of many weeks, the skeleton of only a few days. Thus as regards mere names and the recognition of objects, in the first step of intellectual training, viz., the exercise of the senses, science was easier than the first of the "three Rs."

In the next step, viz. the action or uses of the bones and the letters, the advantage of the skeleton over the alphabet was found to be ridiculously great. A very respectable amount of knowledge of animal mechanics was attainable in less time and with less effort than was necessary to enable the children to say with any degree of certainty what *ough* spells, when presented in combination with other letters.

A dissertation on the mode of teaching the elements of the sciences to such young children would be out of place in this letter; I can only summarise the result of my experience by saying that any and every subject that is intelligible to a man of fifty years of age, may be taught to a child of five years of age—taught, of course in its beginnings, and with suitable illustrations.

The sceptical reader will perhaps better understand me when I remind him that simple addition and simple subtraction are the beginnings of the same mathematics as those by which the Senior Wrangler gains his worthily esteemed honours, and that the highest and most difficult problems of pure algebra are but addition and subtraction sums of a more complex character. Thus when a teacher throws six marbles on the floor and tells the children to count them, then shows four more in his hand, and after these have been counted throws them down with the others, and instructs the children to count the sum, and thus proceeds with further exercises upon picking up various numbers, and counting the remainders, he is teaching mathematics as truly as though he were demonstrating the most difficult problems of the differential and integral calculus. It is in this sense that I speak of science teaching to such young children, and in such a manner any and every branch of science may be taught simultaneously with the alphabet.

Many very sincere friends of education, resident in Edinburgh at the time above stated, were unconvinced of the possibility of thus communicating sound scientific knowledge to children, and in the course of an address on education delivered by Mr. George Combe, he made the following offer, viz.:—That the audience then present, consisting chiefly of artisans, should send to me on the following day some of their children, between ten and twelve years of age, that I should take the first twelve who presented themselves, and at once commence a course of ten or twelve lessons on physiology, at the end of which course the children should be publicly examined on the subject of the teaching.

The experiment was carried out successfully, a large audience assembled at the examination, and many were much surprised at the result, though there was really no good reason for astonishment, the attainments of the children being merely a natural and necessary result of plain unpretentious teaching of the simple and fundamental elements of a subject in which every human being is interested.

If the London School Board think it desirable, I shall have much pleasure in repeating the experiment. About twelve children, of nearly equal ages, taken at random, street Arabs if they please, may form the class. The materials I shall require are a skeleton and a set of Marshall's Physiological Diagrams. After ten or a dozen lessons of about one hour each, I will orally examine the children in any building or before any audience they may select, large or small.

To test the possibility of teaching another class of subjects, that of physiology might be followed by a similar number of lessons on that part of economic science which includes the natural laws upon which the relations between capital and labour, and some other fundamental elements of our social structure, depend. The examinations would be so conducted as to afford to all who attend them the means of judging whether the children had been crammed or truly taught, whether they would be likely to remember or forget the subject of their lessons, and how far this preliminary glimpse of the wonderful work they are themselves able to perform, might stimulate their intellectual appetite and awaken a slumbering sense of their own human dignity and responsibility. W. MATTIEU WILLIAMS

The Green, Woodside, near Croydon

Cramming for Examinations

I ENCLOSE one or two *boná fide* extracts from *elementary* examination papers which have during the past few years come under the notice of candidates officially. I do not wish thereby to reflect so much on the regulations drawn up by senates and committees, as upon the way in which those regulations are carried out by examiners. Though cramming is officially denounced, yet there is scarcely anything which is in greater demand; and, so long as this is the case, candidates will of course insist, in spite of their teachers, upon undergoing the operation.

There are few of the matriculation papers of the London University but proclaim cramming to be the order of the day. The papers in Chemistry cannot certainly be called very difficult;

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this, however, is not surprising, since, for many years, the University has had for examiner one of our ablest chemists and a most eloquent teacher. Nevertheless, observe the following questions, in which the italics are mine :—

"*Describe by equations* as many processes as you know for the preparation of oxygen gas." (1870.)

"*Explain by an equation* the process of making ammonia, &c." (1870.)

"*Give the names and formulæ* of the oxides of nitrogen, &c." (1870.)

These few are the *worst* detected after careful search; but columns of NATURE could be filled at once with the most unnatural questions in all the other subjects. The following, taken at random, will serve as brilliant specimens ; to me they are more heart-rending than the answers given by "Examiner," because even the worst of candidates are corrigible, while examiners do not appear to be so.

"Name the Sovereigns who were reigning in England at the close of each century from the ninth to the eighteenth successively." (1870.)

"Give some estimate of the population of England at the death of Charles II., &c." (1870.)

"Show how the present Royal Family is connected with the House of Tudor, tracing the pedigree to the end of the seventeenth century." (1869.)

"State the principal rules of English syntax." (1869.)

Moreover, candidates are positively compelled to cram their Latin and Greek translation ; the one Greek and the one Latin subject are selected "one year and a half previously," which makes competition of talent against talent so far practically an impossibility ; it is a mere trial of cramming against cramming. And is this portion of the examination of any practical value as proving the efficiency of a candidate ? Let the university answer for itself : "Special stress is laid on accuracy in the answers to the questions in Greek and Latin grammar." Comment is useless.

A much lower standard for Latin translation, and no selection one year and a half previously, would ensure a finer and more useful knowledge of a noble language ; besides this, a little rational conduct on the part of examiners, and a far more vigorous and effective supervision of the papers by the Committee of the Senate, would enable education to go hand in hand with instruction, and learning to part company with cramming.

Most of us know what school training should be ; it should be such as would enlarge the mind, make it capable of comprehending the great and good, and open up a vista of happiness in early years. Teachers know what school training must be ; it must be such as will satisfy inexorable examiners, many of whom appear to be totally unmindful, not only of what should, but of what can, be taught during an ordinary boy's school life.

To one who regards education as the only means of placing man "a little lower than the angels," the questions given at elementary examinations are more than painful.

TEM. AUG. ORME

University College School

Volcano near Celebes

THE following note may be perhaps of interest for the readers of NATURE. March 2.—The Volcano Roeang, near Tagoelanda, the most southern of the Sangi Islands in the North of Celebes, began to make noises. March 5th.—In the evening, at seven o'clock, a frightful eruption took place ; three minutes afterwards a large sea-wave reached the shore of Tagoelanda, about one mile distant from Roeang, and destroyed three villages with 416 men. The mountain worked till March 14, with a heavier final eruption. March 30.—I was at the place and ascended the volcano, which is, according to my measurement, about 2,100 feet high. To proceed into the crater was impossible in consequence of the thick damps of sulphur.

The temperature of the soil at the bottom of the mountain near the sea-shore some inches deep was 45° Réaumur. I brought home a large collection of stones, &c. ; the masses thrown out were principally sulphur, ashes, sand, and mud, besides small and large stones, and even rocks. All details are contained in my diary. I then made a tour round the Sangi Islands, and am about at this moment to visit the isles of Bangka and Limbe in the north and east of North Celebes.

ADOLF BERNHARD MEYER

Manado, Celebes, April

NOTES

VICE-ADMIRAL E. OMMANNEY, C.B., F.R.S., proceeds to Antwerp to represent the Royal Geographical Society of London at the Congress of Geographical Science, which will be held in that city between the 14th and 22nd of this month.

MR. W. CARRUTHERS has just issued his official report for 1870 of the Botanical Department of the British Museum. Several of the Natural Orders and European and British representatives of other orders have been completely rearranged. The most important additions which have been incorporated into the herbarium during the year are : from Formosa, collected by the late Mr. Oldham ; from the Levant, 2,625 species by Prof. Haussknecht : from Martinique, by M. Hahn ; and from various districts of Europe. A large number of fungi have been added from Europe, and from North and South America and Cuba, and among other palæozoic additions, an important series of Devonian plants from Canada, presented by Principal Dawson, of Montreal, illustrating his published memoirs.

THE Monthly and Annual Reports have reached us of the Department of Agriculture of the United States of America for 1868 and 1869. The amount of information which is thus afforded by the Government to the citizens of the United States, may well astonish us in this country. They comprise Reports from practical men on a vast variety of subjects of the utmost importance to the cultivators of the soil : the cultivation of fruit ; the manures best adapted for different soils ; report of recent progress in steam culture ; meteorological statistics ; the physiology of *Trichina spiralis ;* abstract of laws relating to fences and wild stock ; tests for the authenticity of seeds ; agricultural statistics ; report of progress of beet-sugar manufacture in Europe, *et multa alia.*

THE discussion which took place before Parliament relating to the adoption of the metric system in England, is considered by French *savans* as highly discreditable to that body, and the result has occasioned much surprise there.

M. BRETON, one of the great Hachette firm, was returned a member of the Municipal Council of Paris in the Conservative interest. His majority was one vote, which was declared *nil,* as a man had voted without any right, and in spite of the exertions of the chairman of his voting section. Being older than M. Hérisson, his competitor, he was elected merely by the privilege of seniority. Two other publishers who had been candidates were unsuccessful, M. Gernier Baillière and M. Victor Masson.

NO stamp duty is to be imposed on newspapers in France, but a duty will be established on every description of printing-paper. For books it will 8*s.* per cwt. and for newspapers 16*s.* per cwt. Newspaper paper is of an inferior description, and will be charged twice as much as the superior kind. This absurdity is owing to the objection raised to the income-tax by several politicians, amongst them M. Thiers himself. But it is supposed he will very shortly give up his old prejudices.

MR. CARRUTHERS, the keeper of the herbarium at the British Museum, has been appointed consulting botanist to the Royal Agricultural Society.

ONE of the Whitworth Scholarships has recently been awarded to John Armitage, an artizan student at the Oldham School of Science and Art ; last year he gained the Department Silver Medal for Practical Geometry, and in 1869 the silver medal for Machine Drawing. Last year James Taylor, another artizan student from this school, also gained a Whitworth Scholarship, as well as the Department Gold Medal for Mathematics and the silver medal for Theoretical Mechanics.

A LAUDABLE attempt to encourage floriculture in London is an exhibition which was held yesterday in the churchyard of St.

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